

- **Information Management**
 - Situation Analysis
- **Collaboration**
 - Shared Workspaces
- **Communicator**
 - Dialogue

Ron Larsen



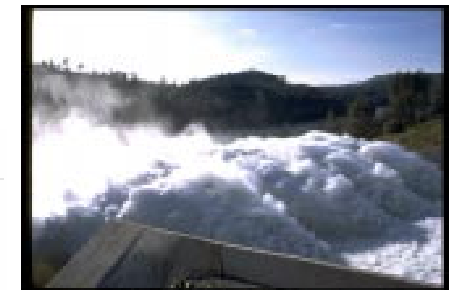
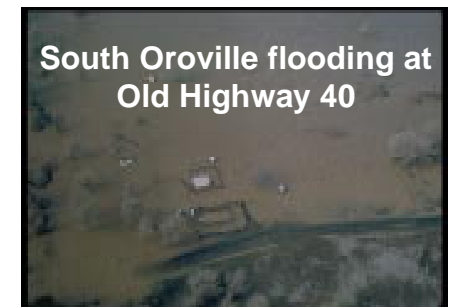
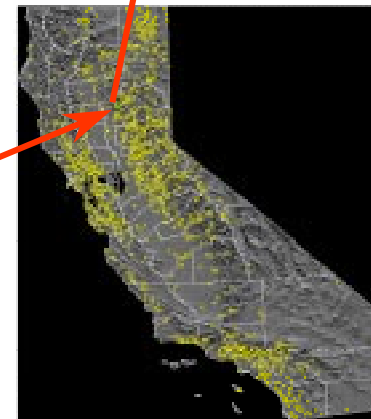
California Dept. of Water Resources (DWR) copes with floods of 1997



Oroville spillway - Normal



- Automated scanning & structuring of DWR reports and tabular data
- Near real-time situation updates
- Geographic, image, text, and numeric data

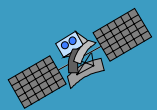
[illegible]

Oroville spillway - Flood

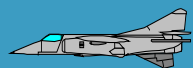


From Situation Awareness...

Information Sources



Surveillance
Satellites



Reconnaissance
Aircraft

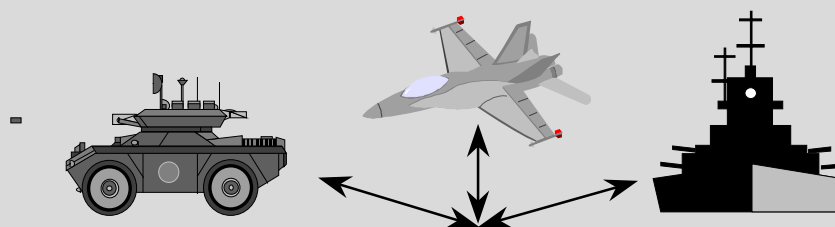


UAVs



Operational
Units

Real-
Time
Tactical &
Reference
Data



Command
& Control

Results

Operations

Situation
Awareness

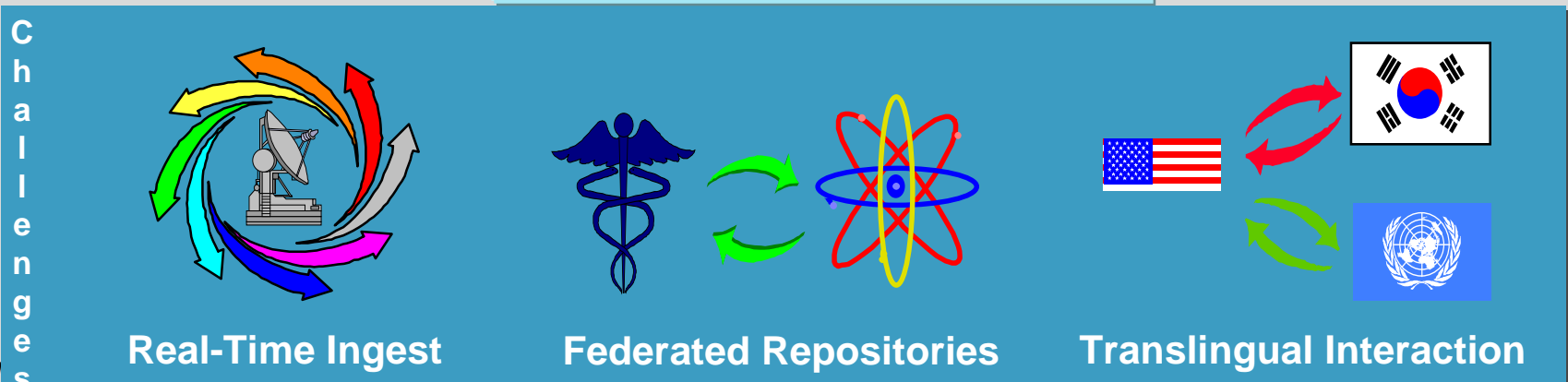
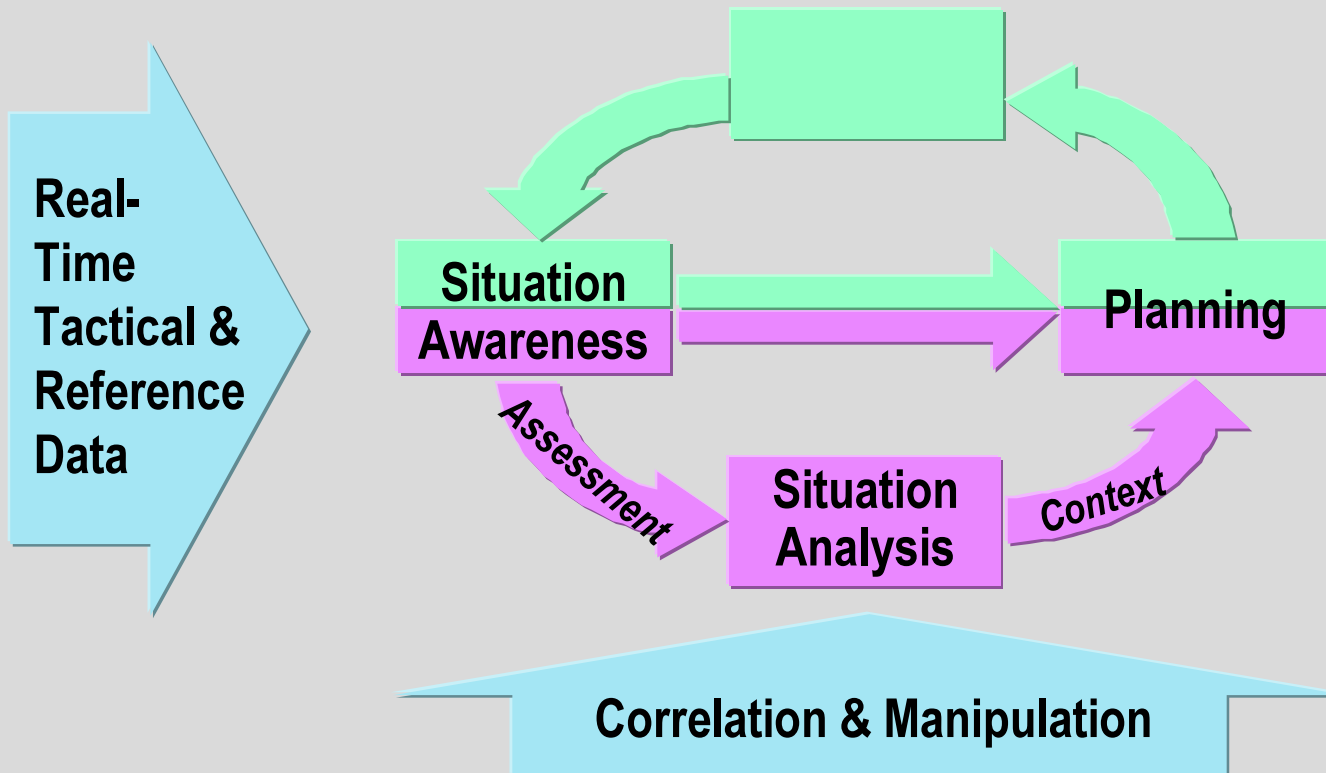
Local / Temporal Status

Planning

ited



To Situation Analysis ...



Approved for

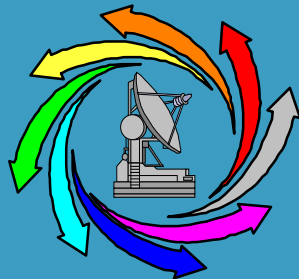


Technology Challenges

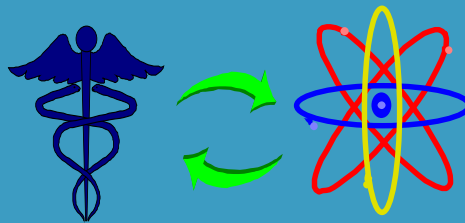
Capturing, interpreting, cataloging, and indexing high rate multimedia data flows in real time

Organizing heterogeneous distributed information sources into comprehensive discipline-oriented, user-accessible repositories

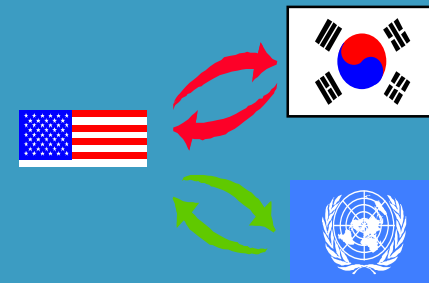
Automatically translating critical information among the native languages of coalition partners



Real-Time Ingest



Federated Repositories



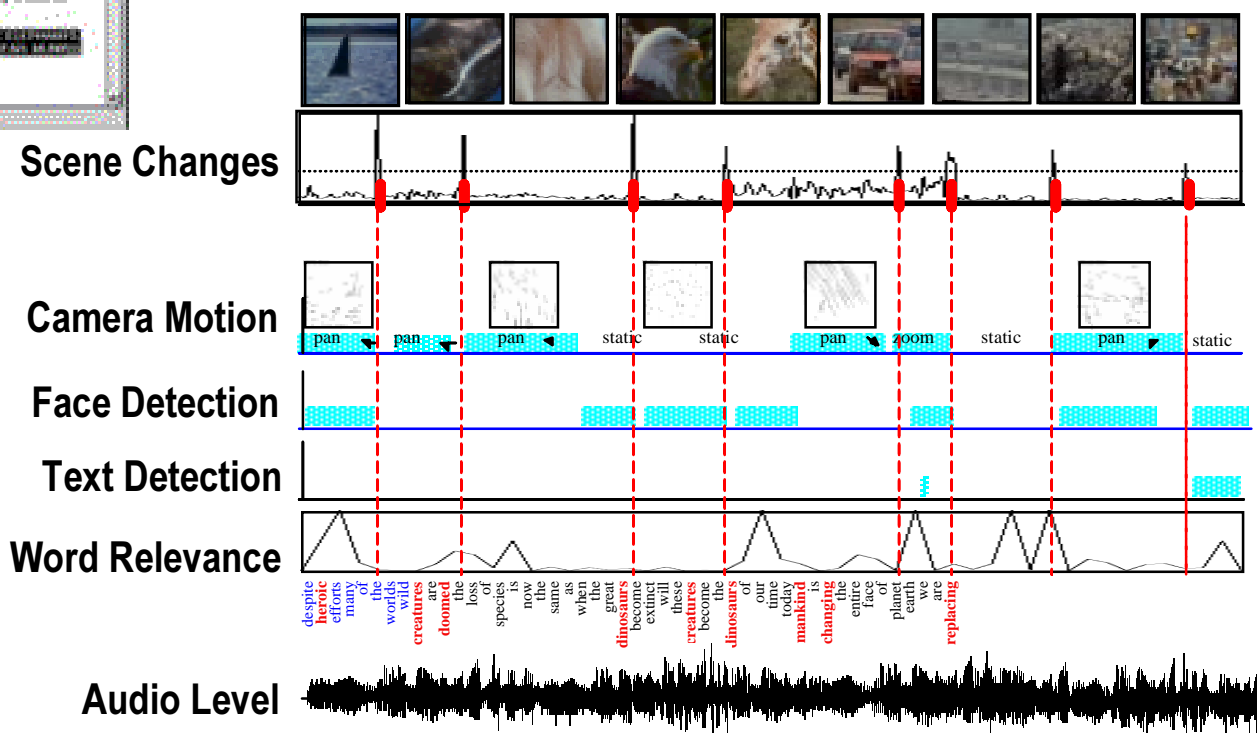
Translingual Interaction



Real-Time Ingest



Integrated Technologies Applied to Video Information





Real-Time Ingest

Representative Effort: **CMU Informedia Digital Video Library**

Challenges

- Full-content search and retrieval from digital video, audio and text libraries
- Utilization of integrated speech, image and natural language understanding for video library creation and exploration
- Speech understanding to automatically derive transcripts
- Image understanding of video scenes for “paragraphing”
- Automatically generated video capsules (skims and summaries)
- Unknown person identification through library name and face co-occurrence, enhanced with video OCR
- Unsupervised improvements to speech recognition from multi-modal broadcast sources



Federated Repositories

Map
browser &
Gazetteer

Interoperability

Multivalent
documents

Infobus

Texture
search

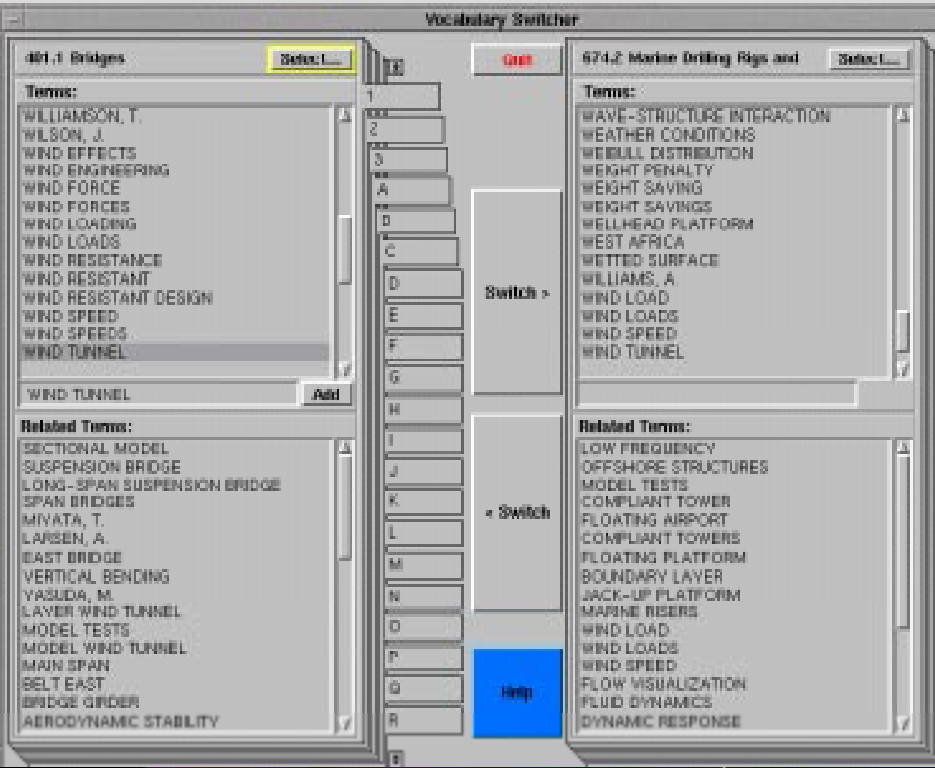
"... not a bounded,
uniform collection of
information, but an open-
ended collection of
services"

T. Winograd

Image
search



Federated Repositories



Vocabulary Switcher

Left Panel (Bridges):

Terms:

- WILLIAMSON, T.
- WILSON, J.
- WIND EFFECTS
- WIND ENGINEERING
- WIND FORCE
- WIND FORCES
- WIND LOADING
- WIND LOADS
- WIND RESISTANCE
- WIND RESISTANT
- WIND RESISTANT DESIGN
- WIND SPEED
- WIND SPEEDS
- WIND TUNNEL

Related Terms:

- SECTIONAL MODEL
- SUSPENSION BRIDGE
- LONG-SPAN SUSPENSION BRIDGE
- SPAN BRIDGES
- MINATA, T.
- LARSEN, A.
- EAST BRIDGE
- VERTICAL BENDING
- YASUDA, M.
- LAYER WIND TUNNEL
- MODEL TESTS
- MODEL WIND TUNNEL
- MAIN SPAN
- SELT EAST
- BRIDGE GIRDER
- AERODYNAMIC STABILITY

Right Panel (674.2 Marine Drilling Rigs and Structures):

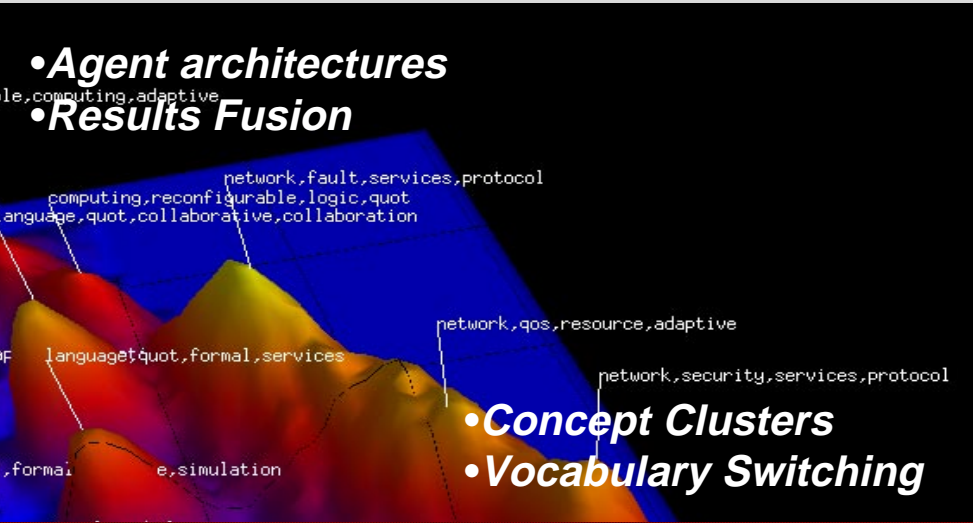
Terms:

- WAVE-STRUCTURE INTERACTION
- WEATHER CONDITIONS
- WEDGUL DISTRIBUTION
- WEIGHT PENALTY
- WEIGHT SAVINGS
- WELLHEAD PLATFORM
- WEST AFRICA
- WETTED SURFACE
- WILLIAMS, A.
- WIND LOAD
- WIND LOADS
- WIND SPEED
- WIND TUNNEL

Related Terms:

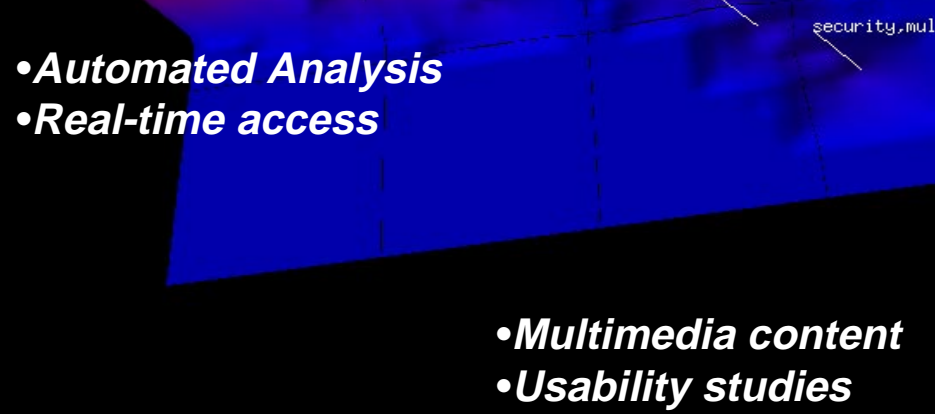
- LOW FREQUENCY
- OFFSHORE STRUCTURES
- MODEL TESTS
- COMPLIANT TOWER
- FLOATING AIRPORT
- COMPLIANT TOWERS
- FLOATING PLATFORM
- BOUNDARY LAYER
- JACK-UP PLATFORM
- MARINE RISERS
- WIND LOAD
- WIND LOADS
- WIND SPEED
- FLOW VISUALIZATION
- FLUID DYNAMICS
- DYNAMIC RESPONSE

- **Agent architectures**
- **Results Fusion**

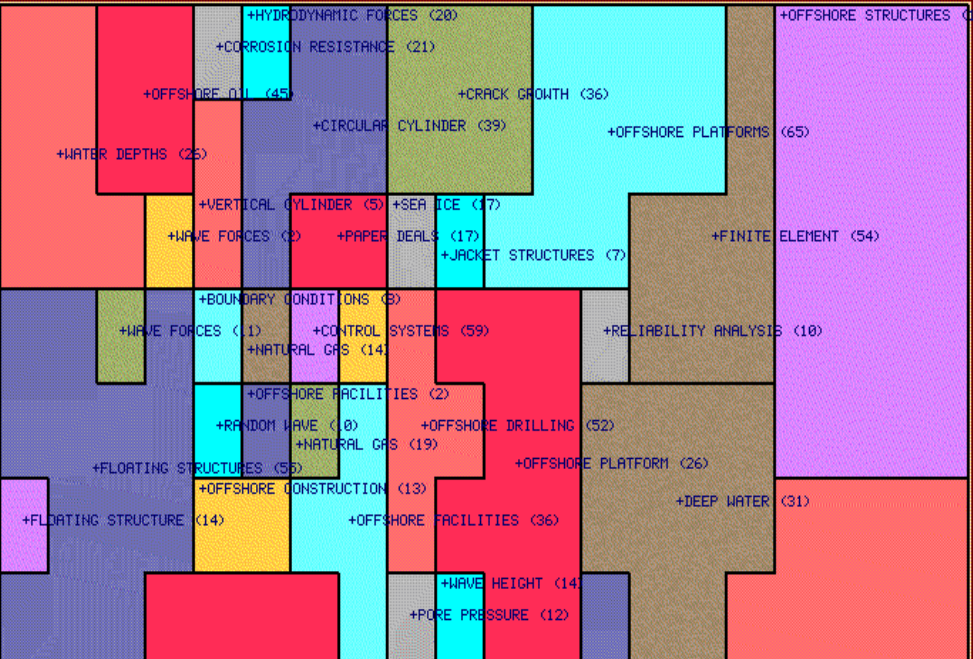


- **Concept Clusters**
- **Vocabulary Switching**

- **Automated Analysis**
- **Real-time access**



- **Multimedia content**
- **Usability studies**





Translingual Interaction



CINC's Daily Guidance Letter

Purpose

- Disseminate CINC's guidance of the past 24 hours
- Planning guidance for Future Operations
- Targeting guidance for Integrated Task Order (ITO) being forecast
- Refine guidance for ITO in planning

Objectives

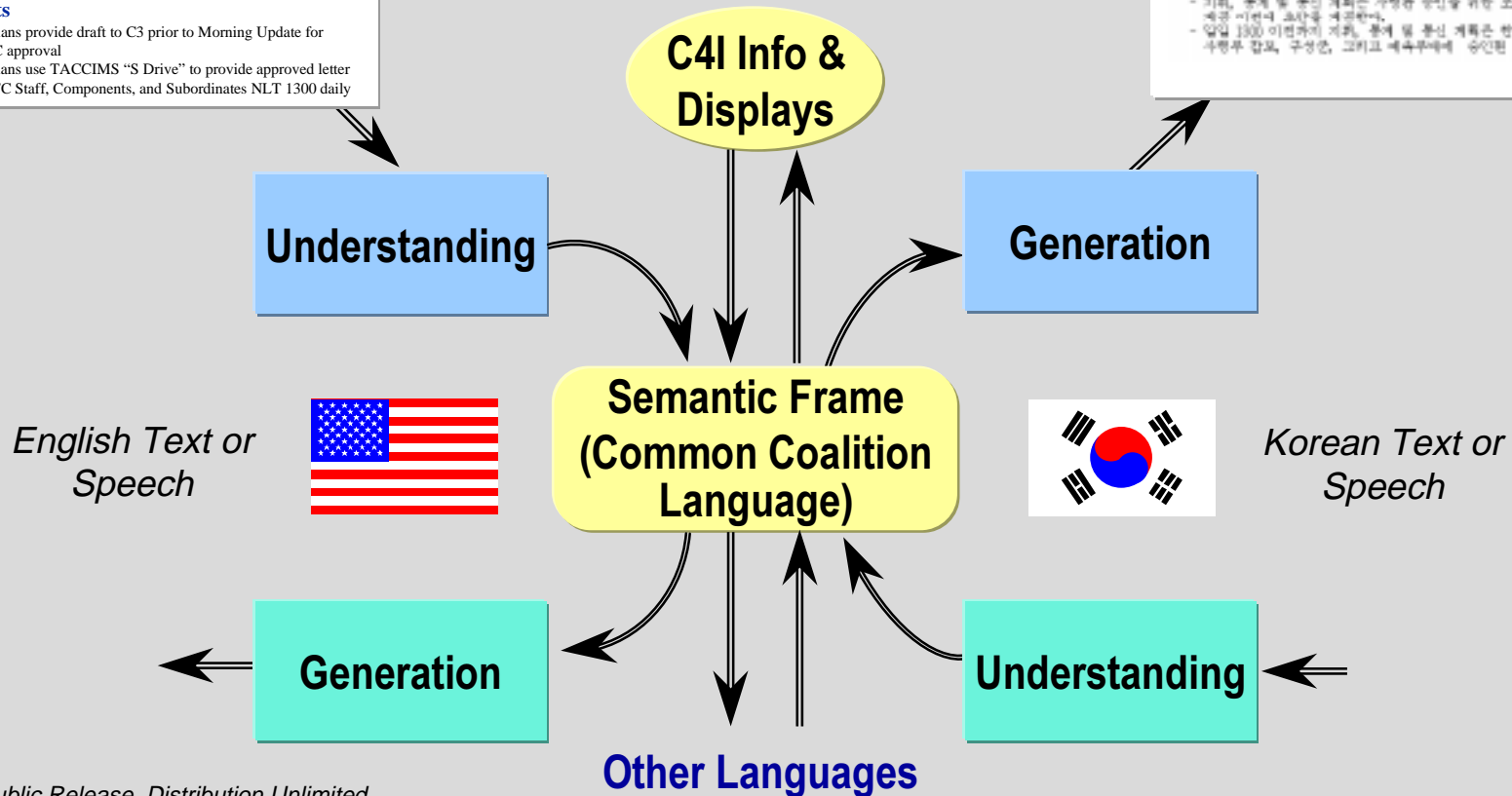
- Summary of CINC's operational guidance for future ops
- Issue CINC's prioritized guidance for targeting objectives

Products

- C3 Plans provide draft to C3 prior to Morning Update for CINC approval
- C3 Plans use TACCIMS "S Drive" to provide approved letter to CFC Staff, Components, and Subordinates NLT 1300 daily

사령관의 일일 지침 서신

- * 목적
 - 과거 24시간의 사령관의 지침을 유포한다.
 - 미래 작전을 위한 계획 지침.
 - 예측하는 통합 임무 명령을 위한 보조 지침.
 - 계획에서의 통합 임무 명령서를 위하여 지침을 상세하게 논한다.
- * 목표
 - 미래 작전을 위한 사령관의 작전 지침의 포괄.
 - 사령관의 목표 목표를 위한 중요한 지침을 전달한다.
- * 절차
 - 기획, 통제 및 통신 계획은 사령관 승인을 위한 초안 최신 정보 제공 이전에 초안을 제공한다.
 - 일일 1300 이전까지 기획, 통제 및 통신 계획은 한/미 연합군 사령관 검토, 수정안, 그리고 예측주위에 승인된 편지를 제공한다.





Translingual Interaction

Representative Effort: **MIT Lincoln Lab English/Korean Translation**

Challenges

- 2-way text (and speech) translation
- Robust translation of complex sentences
- Graphical aids for non-technical users
- Technology transfer to Coalition forces
- Scalability to new domains and languages





Success Criteria/Metrics

Capability	Present	Goal
Federated Repositories	Tens (Custom)	Thousands (Generic)
Items / Repository	Thousands	Millions
Size of "Large" item	1 MB	100 MB
Typical response time	10 seconds	100 milliseconds
Mode	Play & Display	Correlate & Manipulate
Interoperability	Syntactic	Semantic
Filters	Bibliographic	Contextual
Language	Multilingual	Translingual
Content extraction	Forms & Tags	Semi-structured

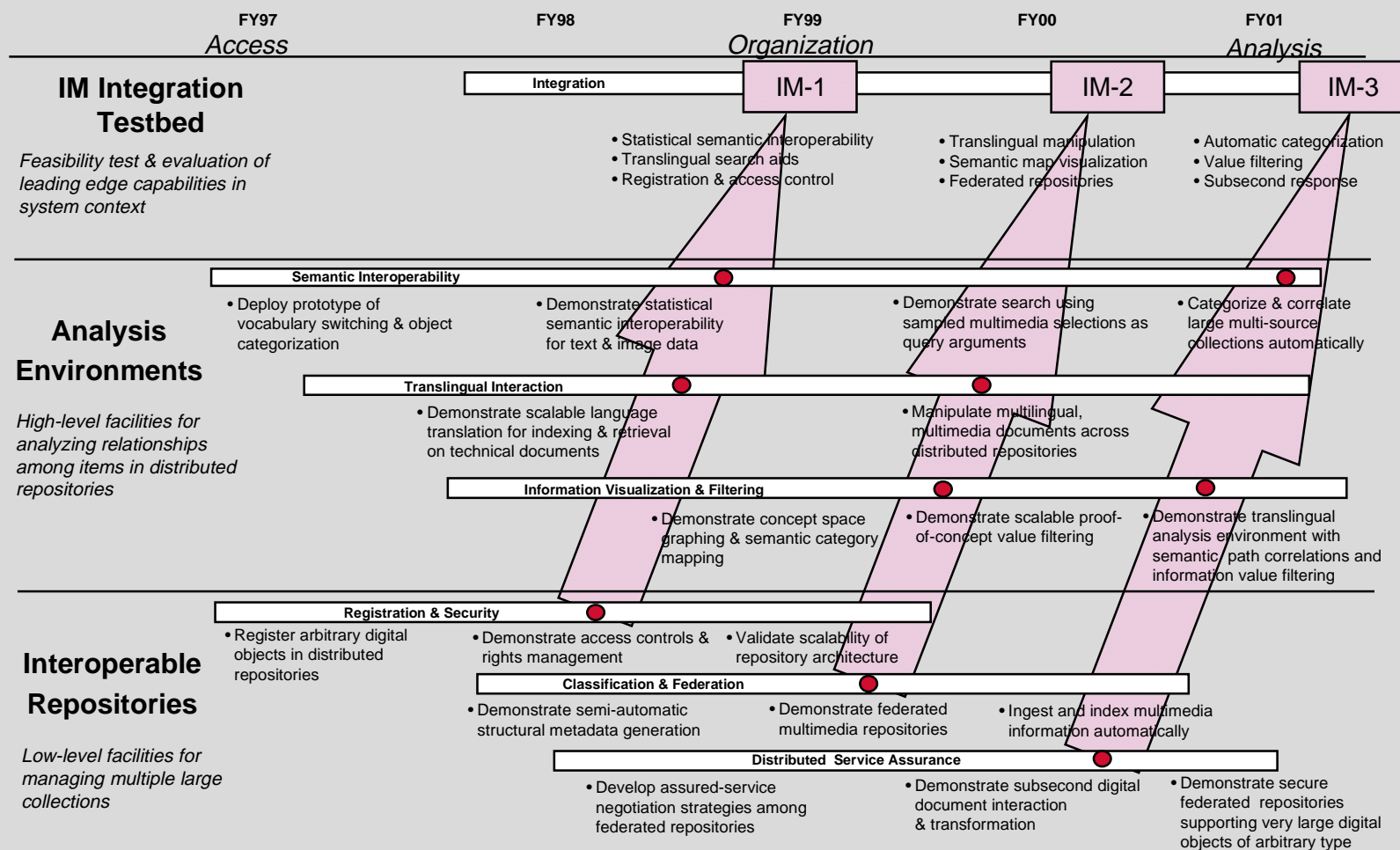
= Scalable technologies to achieve quantitative goals

= Prototype software to achieve qualitative goals

+ Integrated feasibility demonstrations to evaluate component interactions

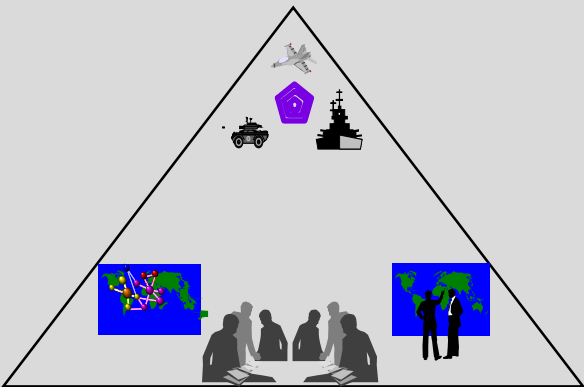







Information Management Roadmap





Technology Insertion Opportunities

<u>Program</u>	<u>Task</u>	<u>Performer</u>	<u>Objective</u>
 Information Management			Integrated Feasibility Demonstrations (under contract)
		 USS Coronado	Forward-deployed Information Access (Battle Lab seed funding)
			Real-time Ingest (Tempo Brave and Tempest Express exercises)
			Defense Virtual Library architecture (CNRI contract)
		 UNITED STATES COPYRIGHT OFFICE <i>The Library of Congress</i>	Electronic Registration and Recordation (CNRI contract)



Information Management

Leading edge technology to “...rapidly acquire, manage, exchange, and understand the massive amount of information relevant to the situation”*

- Information superiority depends on timely and accurate information discovery, filtering, and fusion.

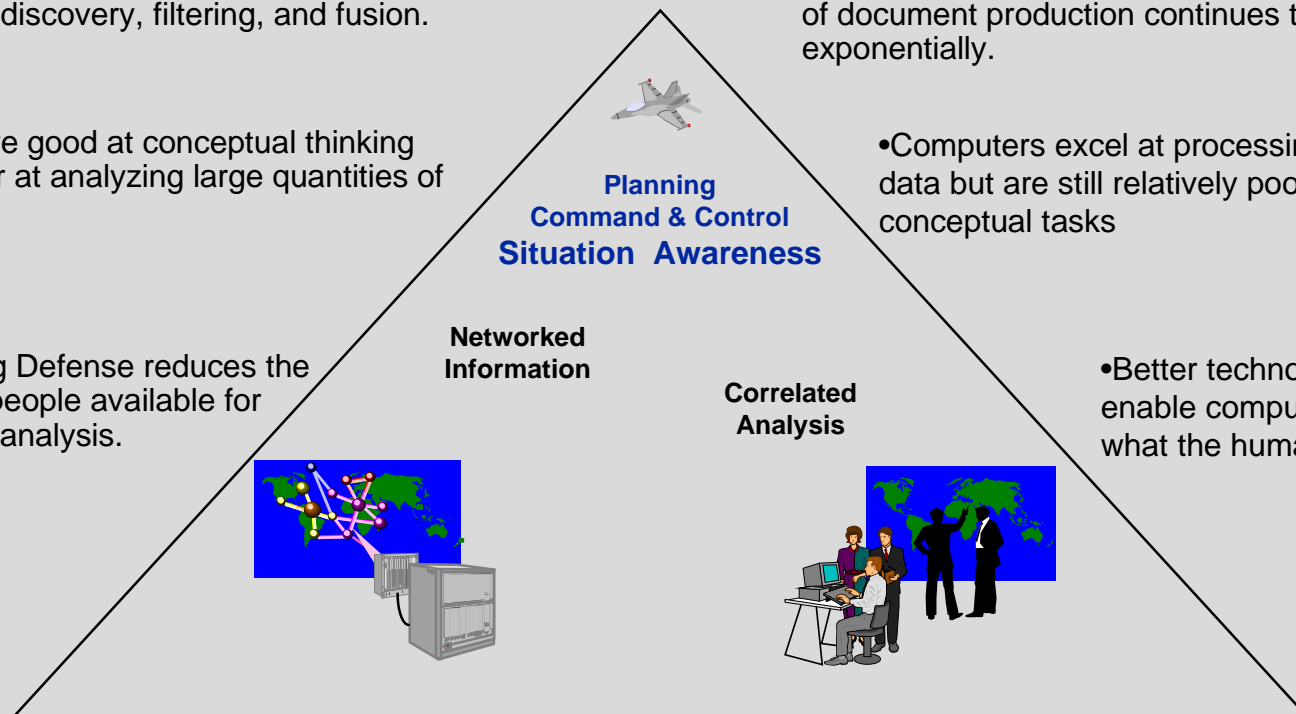
- But the number of document sources and the rate of document production continues to grow exponentially.

- Humans are good at conceptual thinking but are poor at analyzing large quantities of information.

- Computers excel at processing voluminous data but are still relatively poor at conceptual tasks

- Downsizing Defense reduces the number of people available for information analysis.

- Better technology is required to enable computers to do more of what the human analyst does



Make computers able to access, organize, analyze and disseminate the information contained in large, dynamic, multi-media document streams.